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Response to Office Action dated June 3, 2003

production of charging noise (Kisu, column 2, lines 39-61). Kisu therefore represents a modification of contact type charging rollers in which the charging roller 2 is maintained separate from, and out of contact with, the photosensitive drum 1 by a clearance "t", by the provision of spacer layers 2c at the ends of the charging roller.

However, due to the presence of the films 2c in Kisu, the pressure applied by the springs 10 thereof is transferred to the charging roller 2 only at the location of the films 2c so that the pressure applied to the elastomeric outer layer 2b at the region of the films 2c is increased. The high pressure at this location can easily cause deformation of the outer layer 2b, which undesirably decreases the thickness of the clearance "t."

In accordance with present the invention, on the other hand, the ends 86a of the metallic core 86 (referring to the illustrated embodiment for purposes of illustration, and not limitation) have a larger diameter. The elastic member 17" therefore has a reduced thickness "t₁" in the region of the end portions 86, and so deforms to a lesser extent. Since a reduced thickness elastic member will deform less under the pressure applied by the springs 19 via the films 18, the gap G between the charging roller 84 and the drum 5 is maintained more constant despite the pressure applied by the springs 19.

It may therefore be appreciated that the problem to be solved according to the present invention derives from the presence of the films 18 which produce both the gap G and the high pressures at the ends of the roller. The invention, by providing that the opposite end portions of the metallic core have a larger diameter, address this problem.

The Examiner has alleged that it would have been obvious for those skilled in the art "to use the teachings of Kaname et al with the charging device of Kisu to provide a charging

device which eliminates charging irregularities.” Specifically, Kaname et al discloses a charging roller having an elastic cover, and a metallic core with larger diameter axial ends and a smaller diameter mid-portion 20a. Presumably, the Examiner therefore considers that it would have been obvious to adopt such a configuration in Kisu to “eliminate[s] charging irregularities.” However, this is respectfully traversed for at least two reasons:

1. Kisu is not a contact type charging roller.

Kaname et al is directed to a contact type charging roller (see Abstract). According to Kaname et al, in such a contact type roller the electrical resistance between the support shaft “for electrifying the charge receiving body *in contact with it* and its periphery is low near both ends of the electrifying roller 20 in its axial direction, compared to that in its middle part” in order to offset an increase in a required lowest current value. The elimination of charging irregularities is thus a function of the disclosed modification of a contact type charging roller! In contrast, Kisu notes the shortcomings associated with contact type charging rollers and discloses an improvement in which there is *no contact* between the roller 2 and the photosensitive drum 1. Thus, there would have been no reason for those skilled in the art to have expected that the modification taught by Kaname et al for eliminating charging irregularities in a contact type charging roller would be effective in the non-contact type charging roller of Kisu, and so those skilled in the art would not have found it obvious to have incorporated the teachings of Kaname et al in Kisu.

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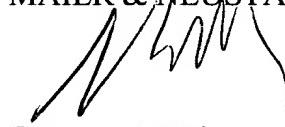
2. Kisu teaches against the proposed modification.

Kisu describes that, due to the presence of the spacers 2c and the clearance “t”, the urging force of the springs 10 can cause the charging roller 2 to deform at its center, with the result that a larger clearance “t” arises between the central portion of the charging roller and the photosensitive drum (column 5, lines 37-47). In order to minimize this occurrence, Kisu proposes *reducing* the diameter of the metal core 2a at the ends (Figure 3B; column 5, line 66-column 6, line 2). This is the *opposite* of what the Examiner has proposed would have been obvious in view of Kaname et al. Kisu thus positively *teaches against* the claimed invention, which is clear evidence of its unobviousness.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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